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to fifteen acres, being the usual average allotted to each. In several of the western cantons these pastures are generally private property; in the east, they commonly belong to the cantons, being apportioned among the different parishes, each having for its cows its *alp* or common pasture. Of this each inhabitant is entitled to a share from June to October.

The Alpine pasturages are elevated in heights of two or or three, or more ranges, according to the season; the herdsmen ascending with their cows and goats, and frequently their sheep, as the heat increases from early spring to the high temperature of July and August. These persons are commonly hired to take charge of the cows of others, as few have such a number as would repay the labour of personally attending them; indeed, they are rarely able to maintain above five or six cows in winter, and usually not more than half that number. The pastures, however, form the principal source of subsistence and wealth to the inhabitants of the greater part of Switzerland, as well as of Savoy, the Voralberg, and the Tyrol.

Each pasture elevation has its own chalets for the herdsmen. These are rude bog-houses: the roof, composed of clumsy shingles, giving vent to the smoke in the absence of a chimney, and projecting eight or ten feet, forms a kind of piazza. M. Simond, who visited one of these dwellings, says:—"Here a fire was already blazing in a sort of pit or trench, dug around by way of a seat, and a huge kettle hung over for the purpose of cheese-making. We had plenty of cream furnished to us, in which the spoon literally stood on end, a kettle to make coffee, and wooden ladles instead of cups. All the utensils were made of maple, of linden, and of a sort of odorous pine, by the shepherds themselves, who bestow much time on this manufacture. We noticed the portable seat, with a single leg, oddly strapped to the back of those who milk the cows; the milkpails, the milk-hod fastened to their shoulders, the measures, the ladles made in the shape of shells, the milk-strainer (a tripod funnel full of pine-leaves), the vase in which rennet (used to coagulate milk) is preserved, the press, the form, and many other implements of their trade, all elegantly shaped and very clean." A wooden gallery, close to the projecting roof, is the place of rest, and is reached by a ladder. The ground around the rude dwelling is so broken and defiled by the cattle, that stepping-stones are required in order to reach the door. When the weather is tempestuous, the herdsmen remain up all night, calling to the cattle, as without this precaution they would take fright, run into dangers, and be lost.

It is a curious fact, but one most amply confirmed, that the whole of the butter produced in any one of the Alpine pastures is preserved sweet, or at least perfectly fit for use, through the whole season, without any admixture of salt. The process adopted is, however, better fitted in its details for a work on domestic economy, than for the purpose contemplated in this article, and hence, with the bare announcement of the circumstance, we must now be content.

The owners of the cows in the Alpine pastures get credit daily for the quantity of milk furnished by these animals; and the produce of the sale of cheese at the end of the season, the expenses being deducted, is divided amongst them in proportion to the total quantity of milk furnished by each. Six or eight goats, or about four calves, sheep, or hogs, are deemed, as to feeding, equivalent to a cow; but a horse is reckoned equal to five or six cows, because he roots up the grass. In some parts of Switzerland, with forty cows, a cheese of forty-five pounds may be made daily; and in the vicinity of Althorf, they make, in the course of a hundred days, from the 20th of June, two cheeses daily, of twenty-five pounds each, from the milk of eighteen cows.

Cheese appears to have been an important article of export from Switzerland from a remote period. The canton of Glarus is the peculiar seat of the Schabzieger, or green cheese. This article is made of cow's, and not of goat's milk, as its name might seem to imply. The peasants, who feed their cattle in the mountains, bring down the curd in sacks, each containing about 200lbs., for which they get about thirty shillings. The cheese owes its peculiar appearance, smell, and flavour, to the blue pansy. This plant grows in small inclosures beside most of the cottages; it is dried, ground to powder, and in that state thrown into the mill along with the curd, in the proportion of three pounds of the plant to a hundred pounds of the curd. After being turned for about two hours and a half, the mixture is ready to be put into the shapes, when it dries sufficiently to be ready for use. When sold wholesale, it fetches about three-pence halfpenny per pound. This is considered a very lucrative trade; and the richest people in the canton are cheese-manufacturers. A considerable quantity of Schabzieger cheese is exported to America.

The district around Gruyere, in the canton of Frieburg, is also famous for its cheese, of which it produces about 25,000 cwt. a-year. It is made on a chain of mountains about ten leagues in length, and four in breadth: all the cheese, though made in the same manner, is not of the same quality; the lower pastures not being so highly esteemed as those in the more elevated situations. The very finest qualities are too delicate for exportation; and Mr. Inglis states, that he tasted cheese in Switzerland far superior to any that can be purchased either in London or Paris. Throughout the commune of Gruyere the inhabitants are above poverty.

MOSSES AND THEIR ALLIES.

CHAPTER I.

Is there a pastoral poem extant which does not in some part or other sing the praise of "mossy banks" or "moss-grown fountains?" Is there, or has there ever been, a landscape-painter who has not longed to give some idea of the exquisite tinting which he sees bestowed on rocks and ruins, trees and banks, by the growth of those insignificant portions of the vegetable kingdom, the mosses and lichens?—or a lover of nature, albeit by profession neither poet nor painter, whose eye has not dwelt with delight on the rich verdure of a moss-clothed vale or hillock, or the brilliant colouring of a lichen-painted rock or ruin? Virgil bids that a "quiet station" be found for the bees, saying,—

> "Near a living spring their mansion place,
> Edged round with moss, and tufts of matted grass."

Milton tells us of "Echoe's mossy couch;" Shakspeare, too, often extols this verdant carpet, as when Arviragus promises that the fair Fidele shall

> "Not lack
> That flower that's like thy face, pale primrose; nor
> The azure harebell, like thy veins; no, nor
> The leaf of eglantine, whom not to slander
> Outsweetened not thy breath; the ruddock would—
> With charitable bill—bring thee all these,
> Yea, and furred moss besides, when flowers are not,
> To winter-ground thy corse."

And yet, lovely as is the whole of the moss tribe, and dear to poet, painter, and the lover of scenery, how comparatively few among us are there who have any knowledge of the curious and interesting structure of these little plants, whose every stem, leaf, and capsule, displays such exquisite delicacy of construction!

There is no season of the year in which we may not find interest and employment amid the mosses and lichens—no soil nor situation where some or other, of one or both families, may not be found. Scarcely any part of the known world is destitute of them. On the coasts of the Icy Sea, where the soil never thaws for more than the depth of a few inches, plants of these kinds are said by travellers to be the only forms of vegetation. In Spitzbergen, Greenland, and even in higher latitudes, they are to be found, as well as on the morasses and volcanic tracks of Iceland; and on the frozen deserts of Siberia, there these little cryptogamous plants may still be seen. Nor only there; for in the arid wastes of burning Africa, it is told us that the traveller Mungo Park was revived and rejoiced by the sight of one of the species of this lovely tribe. Worn out, exhausted, plundered, his strength and courage had well nigh failed, when, to use his own words, —"At this moment, painful as my reflections were, the extraordinary beauty of a small moss irresistibly caught my eye, and though the whole plant was not larger than the tip of one of my fingers, I could not contemplate the delicate conformation of the root, leaves, &c., without admiration. Can that Being, I thought, who planted, watered, and brought to perfection, in this desert part of the world, a thing of so small importance, look with unconcern on creatures formed after his own image? Surely not!' Reflections such as these would not allow me to despair. I started up, disregarding both hunger and fatigue, assured that relief was at hand, and I was not disappointed." This species is supposed to have been the small fern-leaved fork moss *(fissidens bryoides)*, an exquisite little plant, diffusely spread over shady banks and wall-tops.

The muscology of Britain, which contains about four hundred species, most nearly resembles that of North America, and is also closely allied to that of the northern and central parts of the continent of Europe. It is within less than a century that this interesting and widely-extended class of plants has been made the subject of much study or research. The Germans seem to have taken the lead in this branch of botany, but they have been vigorously followed by many illustrious students of nature among our own countrymen, and new discoveries are daily being made in this department of the vegetable kingdom.

The structure of mosses is of the simplest kind, fungi and lichens alone being below them in the scale of vegetation. With mosses commence the rudimental characters of root, branches, and leaves, with which parts every plant of this tribe is furnished, and in the place of a flower they have little vessels usually supported on a stalk, and containing the seed. The stems vary from the twelfth part of an inch to a foot in height; few of them, however, exceeding four inches, and most being much less. The leaves differ in form, some being egg-shaped, others lance-shaped, and very many linear. If examined under a microscope, these will often be found beautifully veined and reticulated; they have generally a bright green hue, which proves the activity of their breathing apparatus; yet there are species brown, purple, and even nearly black, as well as of the palest whitish green. The edges of the leaves are often toothed, or notched like a saw. Mosses are said to be in fruit when the little seed vessel of which we have spoken is formed.

The fructification of this tribe of plants is very peculiar, and by it, more frequently than by any other part, is the species determined. At certain seasons of the year, we may observe a forest of thin stems crowned with these little seed vessels rising above the general level of the clump of moss on which they grow; these stalks are called setæ, or fruit stalks, and the vessels capsules. Let us take that species of moss which grows so commonly on almost every wall we see, the *tortula muralis*, or wall screw-moss (fig. 1, *a*), as our example, and examine it carefully. The theca (fig. 1, *b*), or fruit of this, has a little cap, like that of a Norman peasant, with a high peak and long lappet (fig. 1, *d*); this is the calyptra, or veil, and forms a sort of hood which, when the fruit is young, is rolled round the theca, so as completely to cover it. As the fruit-stalks lengthen this veil is torn from its support and carried up on the top of the seed vessel, much as the calyx of the *escholtzia* is borne up on the summit of the petals before they open. Now if we place this seed vessel under the microscope, we shall find that beneath the veil is a lid or covering, which closes the mouth of the capsule; this, when the spores or seeds are ripe and fit to be dispersed, is thrown off, and then new and wonderful objects are disclosed; underneath this lid (which is called the operculum), lies a kind of tuft of twisted hairs (fig. 1, *c*), which arise from within the rim of the theca, and are called the teeth of the fringe, or peristome. These do not exist in all species of moss, and when they are found, differ in number; but it is an unvarying rule that wherever they are seen at all, their number consists of *four*, or of some multiple of four, amounting occasionally to as many as sixty-four. Sometimes the fringe consists of two rows of teeth, differing in size, number, or arrangement; and this fringe acts in the most beautiful hygrometrical manner. A theca of this same *tortula* will illustrate my meaning, and show this to be one of those beautiful and delicate arrangements which the wisdom and goodness of God provides for the protection of the young seed. Take a capsule which has been dried when the teeth were closed, and place it in water, or in a damp place, and you will see its teeth unclose with a graceful and steady motion which is beautiful to behold; or if you breathe on a capsule when its fringe is expanded in the sunshine, the slight moisture of your breath will make the little teeth instantly close over the mouth of the vessel wherein the seeds lie. In dry and sunny weather these teeth open, and the seeds, when ripe, are scattered by the wind, and wafted to situations where it is suitable for them to fix. The capsule being elevated on its footstalk, is freely exposed to the effects of sun and wind; thus the seed is first ripened, and then disseminated over the masses of recumbent moss below them, so keeping up and extending an active fresh vegetation, whilst the decaying plants form fresh soil whereon the new ones may grow. The capsule of the tortula is oblong, the lid conical, the leaves expanded, and of a very long oblong; their margins bent back, and the nerve protruded beyond the leaf into a white hair-like point. The seeds lie inside the theca, and are contained in a thin bag, open at the upper end, and surrounding a central column called the columella. Such is the usual conformation of mosses, the organs of which I have spoken—root, stem, leaves, and capsule—being present in all, though they vary in form, arrangement, and other particulars according to the different genera of which they are members. In some the root is longer and more creeping than in others; the stems differ in length and in other points, some being branched, others simple; some feathered with leaves from base to apex, others bare at the base. The shape and veining of the leaves also varies in different kinds as do the fruit-stalks, some being curved, as in fig. 2, others erect, as in fig. 3. Some proceeding from the centre of the plant, as fig. 2, whilst others are borne on lateral branches, as fig. 5, and some kinds are devoid of them altogether, the capsule being sessile, and buried among the foliage.

The grand distinguishing features which mark the genera are chiefly found in the form and position of the theca, and the structure of the calyptra, or veil. Space will only allow of our slightly touching on a few of these variations, and those who are disposed to study the subject of mosses to a greater length, are referred to the "Muscologia Brittanica" of Drs. Hooker and Taylor, and other works which bear directly on the topic; but we may adduce a few instances of the distinctions to be found in some of the commonest genera.

In the *sphagnum* (fig. 4), those pale whitish mosses which carpet the ground in bogs, the theca is sessile, that which looks like a fruit-stalk being in fact a continuation of the receptacle, and its form is that of a little cup, the mouth of which is uncovered. In the *Bartramia*, the theca is sub-globose, and seated on a terminal fruit-stalk—this has a double fringe, the outer of sixteen teeth; the inner, a membrane divided into sixteen segments, each of which is cleft into two parts, and the calyptra is divided in half. The *polytrichum*, or hair-moss (fig. 5), has a double peristome, or fringe, the outer of thirty-two, or sixty-four incurved teeth, placed at equal distances; the inner a thick membrane connected with the outer teeth. The veil of this is also divided in half. The *encalypta*, or extinguisher-moss (fig. 6), has a terminal fruit-stalk, and its calyptra is so large, as wholly to cover and conceal the theca, looking like an extinguisher placed over a candle. This species grows on wall tops, and appears with the wall tortula, and the pretty cushion-moss, *Grimmia pulvinata*, very early in the season. This latter is called by children, "*pincushion-moss*," because, when covered with its fruit, it looks not unlike a cushion stuck with small pins. It has an ovate theca, the fruit stalk is rather short and curved, the lid conical, and the calyptra in the form of a mitre. The capsule of *andrea* is provided with valves, and opens with longitudinal clefts, whilst *phascum*, and others, have persistent lids. In some of the genera, the veil is irregularly rent, in others it is perfect; in some it has the form of a mitre, whilst others are beautifully plaited at the base. The difference in the leaves, growth, &c., of the various kinds are innumerable, yet though the parts differ from each other, the general characteristics which distinguish mosses from plants of every other tribe are so marked and peculiar, that no one need be at a loss to know a moss from any other individual of the vegetable kingdom.

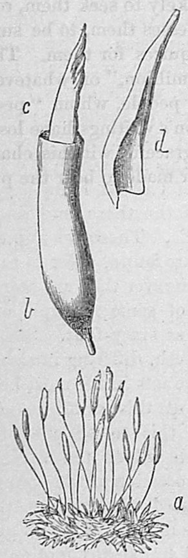

FIG. 1.

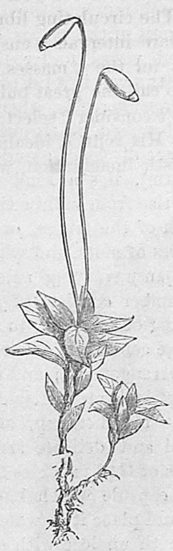

FIG. 2.

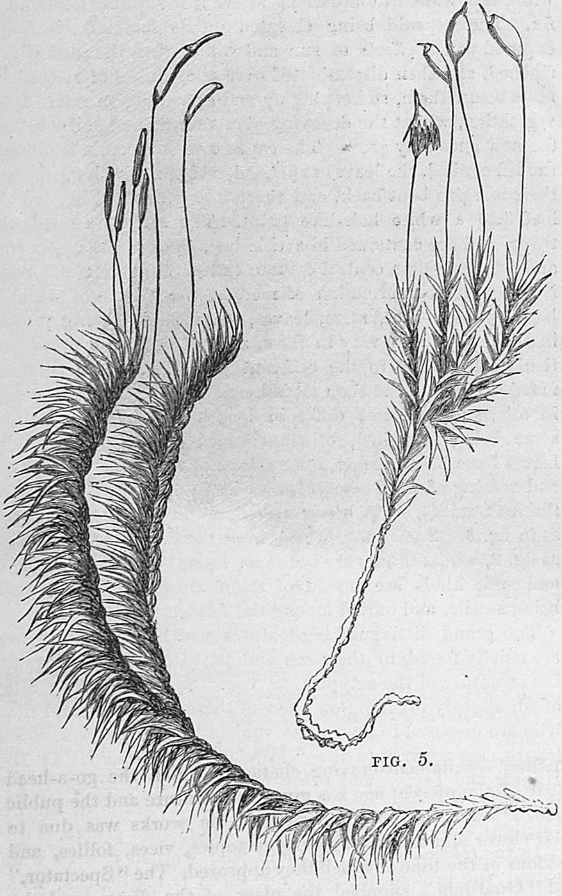

FIG. 3.

FIG. 5.

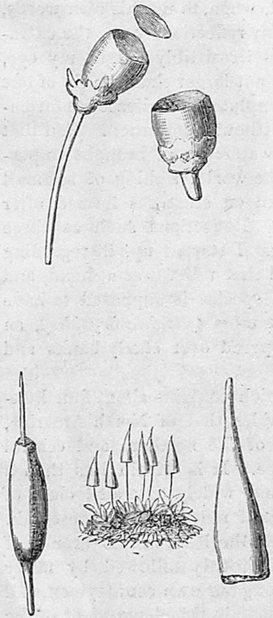

FIG. 6.

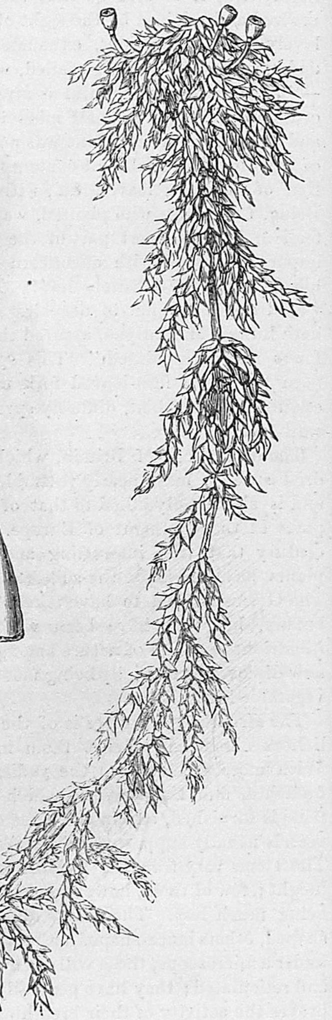

FIG. 4.

Mrs. Somerville, in her "Physical Geography," gives some curious facts, regarding mosses and lichens, on those antarctic lands which are scattered at immense distances from each other round the south pole. She says, "As the latitude increases the vegetation decreases, till at last utter destitution prevails, not a lichen clothes the rocks, nor a sea-weed lives beneath the gelid waves. On the arctic regions, on the contrary, no land has yet been discovered wholly destitute of vegetable life. The difference seems to arise more from the want of warmth in summer, than from the greater degree of cold in winter."